Masked priming investigation of cross-linguistic "false friends" with Japanese EFL learners

Seth Goss
The Ohio State University

1.0 Introduction

Competing theories have proposed that bilinguals' first and second language mental lexicons may be either separate or shared. Separate lexicons would entail that little interaction occurs between words in the two languages when reading. On the other hand, recent research has pointed toward a shared lexicon, allowing for a given word to be activated simultaneously in both languages (e.g., Dijkstra & Van Heuven, 2002). Masked priming tasks, in which a prime is very briefly presented prior to a target word, are one common method used to test how the lexicons of a reader's two languages are organized. In particular, masked primes are generally not consciously recognizable to the viewer, enabling us to investigate the relationship between the prime and the target word at an early stage of processing. Earlier research has focused on alphabetic languages, but more recently, theories of the organization of the bilingual lexicon have been tested with non-alphabetic East Asian languages like Japanese and Korean (Kim & Davis, 2003; Nakayama et al., 2011). These results confirmed that even when presented in differing scripts, translation cognates in one language facilitate the recognition of equivalents in the other language (e.g. ボール [bo:ru] – BALL).

The current study used a masked priming paradigm to add to the growing body of cross-script evidence by first reproducing findings on Japanese-English cognate translation pairs, and second strengthening shared-lexicon models by showing an inhibitory effect in "false friend" prime-target pairs. An example of an English-Japanese false-friend is the word 'take,' which can be (mis)read moraically in Japanese as タケ [ta.ke]. Given the observed tendency for Japanese EFL learners to occasionally read English CVCV words according to the Japanese mora structure, I predicted the following: 1) Translation cognates will facilitate lexical decisions compared to other primes, 2) False friend primes will slow decision times compared to both cognate and unrelated primes, 3) False friend primes will yield lower accuracy than both cognate and unrelated primes.

2.0 Methods

Twenty-four Japanese university students participated in this study. All participants were currently enrolled in a university EFL course. Their average TOEIC score was 570 (*SD* = 178), which is generally considered to be lower-intermediate proficiency. Target words consisted of 48 frequency-controlled English words that can be pronounced ambiguously in accord with the Japanese mora structure (*bike*, *mine*, *tone*). Primes were all presented in the *katakana* script, which is generally used to write words of foreign origin. Table 1 presents the three types of *katakana* primes used: 1) Cognate primes which were the correct *katakana* reading of the English target, 2) False-friend primes (called Test primes below), 3) Unrelated word primes. An additional 48 English words, which did not adhere orthographically to the mora structure of Japanese (i.e., featuring consonant clusters not found in Japanese), were included as fillers, and were only primed by cognates. These are called Filler-cognates in Table 1, and were included to ensure that the CVCV structure of the English target words alone did not produce faster reading times. 96 English-based nonwords were added as 'No' responses, yielding a total of 192 trials, from which three counterbalanced lists were created. As we can see in Figure 1, for each trial,

participants saw a forward mask for 500 ms, followed by a 50 ms *katakana* prime, then the English target word, mirroring the design used in previous masked priming studies. Participants were instructed to decide by key-press as quickly as possible whether or not they thought the target word existed in English. All stimuli were presented on a laptop computer running SuperLab 4.5 presentation software.

Table 1. Sample prime-target pairs for each condition

Condition	Prime	Target
Cognate	テイク [te.i.ku]	TAKE
Test (False-friend)	タケ [ta.ke]	TAKE
Unrelated	ハム [ha.mu]	TAKE
Filler-cognate	キング [ki.n.gu]	KING

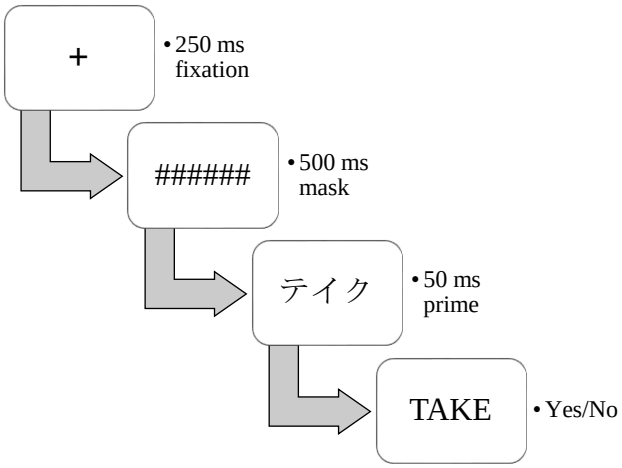

Figure 1. Sample presentation order of a Cognate-prime condition trial.

3.0 Results

Table 2 presents the average reaction times and accuracy for each of the prime conditions. Incorrect responses were excluded from the mean RTs. We see that Cognate primes resulted in shorter decision times and higher response accuracy than both the Test and Unrelated prime conditions. Note also that the Filler-cognates, which featured a different syllable structure than the other conditions, also yielded short RTs and high accuracy. Thus, we can rule out the possibility that CVCV-structured English words were inherently easier than other syllable structures. Table 3 shows pairwise comparisons among each of the prime conditions. Here we see that Cognates required significantly less time to judge than both the Test (t = 2.21, $p < .05$) and Unrelated (t = 3.16, $p < .01$) prime conditions. Reaction times for the Test and Unrelated conditions, however, did not differ, indicating that the predicted interference from False-friend primes was not present above the slowdown observed for Unrelated primes. Yet, when responses by prime type were examined, Test primes resulted in a significant drop in lexical decision accuracy compared with Cognate primes (t = 2.37, $p < .05$). Moreover, no statistical difference was found in accuracy between Cognate and Unrelated primes, suggesting that in fact False-friend primes caused interference at the level of language selection.

Table 2. Mean RTs and accuracy scores by prime type

	Cognate	Test	Unrelated	Filler Cog.
Mean RT (ms)	665	742	779	671
Accuracy	92%	84%	88%	94%

Table 3. Pairwise comparison of mean RTs and accuracy scores

	Mean RT	Accuracy
Cognate – Test	$t = 2.21$, $p < .05$	$t = 2.37$, $p < .05$
Test – Unrelated	$t = 1.01$, ns	$t = .982$, ns
Cognate – Unrelated	$t = 3.16$, $p < .01$	$t = 1.29$, ns
Cognate – Filler Cog.	$t = .202$, ns	$t = .951$, ns

4.0 Conclusion

The present cross-script masked priming study first replicated previous findings by showing that *katakana* cognate primes sped up decision times on alphabetic English targets. The second prediction, however, was not borne out in that phonological False-friend Test primes did not slow decision times relative to wholly unrelated primes. Despite not finding an increased slowdown in the false-friend prime condition, lexical decision accuracy fell significantly in the Test-prime condition only, suggesting that the rapid activation of the prime's phonological code (i.e., Japanese) caused participants to incorrectly select the target word's language, which resulted in an incorrect rejection of the English target. This finding supports the notion of a shared bilingual lexicon, since *katakana* script false-friend primes, with no orthographic overlap with the alphabetic targets, caused interference with the identification of English words. We can thus rule out visual similarity as the source of interference, suggesting that phonological-level connections exist between words in a bilinguals' two languages. In sum, the present results show that relatively low-proficiency EFL learners are still relying on L1 phonology to access their L2 lexicon, often to the detriment of word recognition accuracy. A future study is planned to explore the effect of these three prime conditions in a lexical naming task, which requires learners to vocalize the English target words.

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